

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: Roland R. Thompson  
and Michael S. Blackstone

Attorney Docket No.: 98-40287-US-CIP

Serial No.: Not yet known

Filed: October 15, 1999

For: SYSTEM AND METHOD FOR  
PERFORMING SUBSTITUTE  
FULFILLMENT INFORMATION  
COMPILATION AND  
NOTIFICATION

NEW APPLICATION TRANSMITTAL

Box PATENT APPLICATION  
Assistant Commissioner for Patents  
Washington, D.C. 20231

Sir:

Enclosed for filing is a new application for the above-entitled invention.

The present application is a continuation-in-part of U.S. application serial no. 09/217,116 filed December 21, 1998, which is hereby incorporated herein by reference.

The application consists of:

38 pages of specification;  
12 pages of claims;  
1 page of abstract; and  
26 sheets of informal drawings.

EXPRESS MAIL CERTIFICATE (37 CFR 1.10)

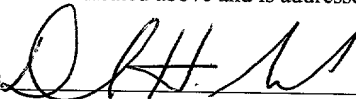
Express Mail Label No. EL166820247US

Date of Deposit October 15, 1999

I hereby certify that this paper, and the papers and/or fees referred to herein as transmitted, submitted or enclosed, are being deposited with the U.S. Postal Service "Express Mail Post Office to Addressee" service under 37 CFR §1.10 on the date indicated above and is addressed to the Assistant Commissioner for Patents, Washington, D.C. 20231.

Name Daniel H. Golub

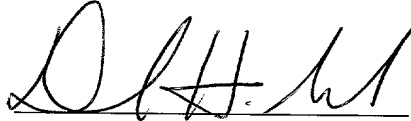
Signature



The inventors for this application are Roland R. Thompson, 2 Dawn's Way, Malvern, PA 19355; and Michael S. Blackstone, 1503 Burgoyne, Downingtown, PA 19335. Both inventors are citizens of the United States.

It is respectfully requested that a Notice to File Missing Parts for this matter be directed to the undersigned.

Respectfully submitted,

A handwritten signature in black ink, appearing to read 'D.H. Golub', written over a horizontal line.

Daniel H. Golub  
Registration No. 33,701

REED SMITH SHAW & McCLAY LLP  
2500 One Liberty Place  
1650 Market Street  
Philadelphia, Pennsylvania 19103-7301

215/851-8268

Dated: October 15, 1999

RECEIVED  
OCT 15 1999  
FBI - PHILADELPHIA

SYSTEM AND METHOD FOR PERFORMING SUBSTITUTE FULFILLMENT  
INFORMATION COMPILATION AND NOTIFICATION

5

CROSS-REFERENCE TO RELATED APPLICATION

The present application is a continuation-in-part of U.S Appl. Serial No. 09/217,116, filed December 21, 1998, which is hereby incorporated herein by reference.

10

FIELD OF THE INVENTION

15

20

The present invention generally relates to systems and methods for human resources management. More particularly, the present invention relates to systems and methods for performing substitute fulfillment, compiling absence and entitlement information, notifications of unexpected events, and notifications of benefits and policies. Still more particularly, the present invention relates to systems and methods for shifting the burden of performing substitute fulfillment and information notification away from affected organizations, for centralizing substitute fulfillment and notification tasks, and for enhancing the efficacy and reliability of these procedures.

25

BACKGROUND OF THE INVENTION

30

To date, location of a replacement to fill a temporary employee absence in an organization, a process referred to as "substitute fulfillment," has generally been an unreliable, labor-intensive, often panic-driven, process. In any organization, the absence of a worker can have perceptible consequences throughout the

workplace. The consequences of an employee absence will vary with the nature of the work environment and with the scope of the employee's position; other relevant factors may include, for example, upcoming deadlines and patterns of absenteeism in the particular organization. Those consequences may be immediate and drastic, as when an assembly line shuts down due to the absence of a critical worker on the line, or more attenuated and moderate, as when another employee is distracted from his primary task to answer telephones due to the absence of the office receptionist. In a typical case, those consequences may include diversion of management resources to address the consequences of the absence; delays in accomplishing projects in which the absentee has a role; displacement of other employees, who must fulfill the absentee's role, either by express assignment or in order to complete their own tasks; reduced productivity; fines levied against the organization, particularly if the absence impacts safety or other government-regulated aspects of the work environment; and, in an extreme but not uncommon case, the inability to complete the central task of the organization.

In the latter case, assignment of a substitute worker is imperative or "mission-critical"--without a substitute worker, the mission of the organization will not go forward -- so filling the vacancy with a temporary replacement is the only acceptable alternative; in other cases, assignment of a substitute worker may not be mission-critical, but may nevertheless be a preferred policy in order to minimize the consequences of any absence. As a result, an upcoming absence may impact the workplace even before the absence period begins, as managers consider ways of compensating for the absence.

Examples of work environments in which substitute fulfillment may be a mission-critical task include schools, emergency services, and manufacturing plants, particularly plants with an assembly-line operation. The replacement of an absent teacher with a substitute teacher is a commonly occurring example of a mission-critical substitute-fulfillment objective.

Thus, in an organization where a substitute is necessary or desired, when an employee notifies the organization that he will be absent, management must necessarily turn its attention to the substitute fulfillment task, or risk a noticeable reduction in the productivity of the organization or an inability to accomplish the business of the organization for the entire absence period. Although seemingly simple in concept, the substitute fulfillment task is non-trivial, requiring managers to devote significant time, effort and other resources, with no guarantee of success. Substitute fulfillment is complicated by the number of intermediate tasks that must be accomplished and constraints that must be satisfied to successfully realize a particular substitute fulfillment in a timely fashion.

The absent worker may, and usually does, provide notice of his impending absence less than a day, or even only several hours, before he is expected at work. Thus, management often enters the substitute fulfillment task with little time to carry it out; if the process is not automated in any aspect, then management must direct each step of the process. Once the absence, which may extend from only hours to several days, or even months, is known, management must typically identify the

scope of the absentee worker's critical responsibilities and skills to establish criteria for identifying a suitable substitute and develop a substitution candidate profile. Typically, multiple substitution candidate profiles may be established, with more demanding requirements for ideal or preferred substitutes, and with less demanding, threshold requirements for merely acceptable substitutes. Once the appropriate qualifications for an acceptable substitute are established, management may consider potential replacements from a prepared list of candidates, or alternatively, management may identify potential candidates by some other means. Candidates may be regular employees of the affected workplace, for example, assembly line workers at a manufacturing plant who work different shifts from the absentee, or, persons from outside the workplace, for example, substitute teachers registered with a school district.

Management must then contact potential replacements, typically by telephone, and determine whether potential replacements are available and willing to work at the desired times in the desired position. Merely reaching potential substitutes may require several attempts. In the best case, management will eventually locate and assign an available substitute to cover the vacancy; in the worst case, management will be unable to find a substitute, despite having expended significant resources on the substitute fulfillment task. The substitute fulfillment task is substantially, but not wholly complete when the available substitute is assigned; typically, management performing the substitute fulfillment must then notify the appropriate persons that a substitute has been confirmed to facilitate inclusion

of the substitute in the workplace. Due to the complexity of the substitute fulfillment task and the diversion of resources it entails, many workplaces may forego substitute fulfillment despite its desirability.

5           Substitute fulfillment is a routine practice in the education system, especially at the primary and secondary school levels. An example of substitute fulfillment for a high school teacher is provided herein as an accessible example and for reference. The  
10       substitute fulfillment task usually is triggered in a school when a teacher "calls in sick." Depending on the degree to which substitute fulfillment is automated in the school or district, locating a substitute teacher may require the efforts of a principal or other  
15       administrator, as well as several support staff members. Once a teacher has called in sick or otherwise signaled his absence, perhaps the night before or even the morning of the absence, the responsible administrator must disrupt her schedule to focus on the substitute  
20       fulfillment task. If she is unable to find a substitute teacher, the operation of the class, the department, and even the whole school may be disrupted. For example, the affected classes may fall behind in their scheduled curricula, an administrator or other teachers may have to  
25       neglect their other duties to cover for the absentee, and the school may even be fined by the state for failing to provide an acceptable substitute teacher.

30           In order to perform the substitute fulfillment, generally, first, the administrator must determine which classes the absent teacher teaches and what skills are required of a replacement. In the education system context, state law may also regulate the minimal

SECRET - 33251-460

qualifications for a substitute teacher, both in general and for the specific type of position that must be filled. Thus, if an absent teacher is a high school science teacher who teaches AP Physics and basic chemistry, a replacement may be required not only to have a college degree but also specifically to have pursued college-level classes in both subjects. The administrator then typically identifies acceptable substitutes from the substitutes registered with the school district. The administrator then telephones potential substitutes to check their availability and willingness to take on the assignment. Sometimes she may have to telephone an individual substitute several times to speak with him and obtain a response. If she locates and confirms a substitute, she may then have to inform the relevant department head or other teachers and to complete paperwork to process the substitute assignment.

At present, computer systems for supporting substitute fulfillment are known in the education field. Individual schools in a school district typically share a single such system installed at the school district level. Typical system equipment includes at least one dedicated computer, combined with specialized telephony equipment, including multiple phone lines, and other equipment. The equipment is expensive and set-up of the substitute fulfillment system may be technically demanding. A school district must invest in equipment adequate to handle its anticipated volume of use. In order to upgrade the system, often all of the equipment must be replaced, at substantial expense and annoyance. Such systems are sold by several vendors under the trade names SubFinder (CRS, Inc.), and Substitute Teacher Management System (TSSI).





decentralized nature of substitute fulfillment management in present systems, it is virtually impossible for school districts to share information and common substitute fulfillment resources. For the same reason, compilation or aggregation of data relating to substitute fulfillment across school districts is difficult and uncommon. All of the costs, responsibilities, disadvantages, and inconveniences of substitute fulfillment are typically borne exclusively and separately by individual school districts and schools.

Additionally, organizations including but not limited to schools, school districts and business entities require a centralized system and method of tracking workers' absences and entitlements, including but not limited to used and available vacation, personal and sick time. Administrators and workers have a time-consuming, inefficient and often inaccurate procedures for recording absences and entitlements. This results in labor-intensive recordation procedures and often no universal record (for both access by administrators and workers) detailing up-to-date absences and entitlements for the particular worker, a group of workers or the overall workforce of the organization.

Organizations also require an efficient, current and easily accessible system and method for recording and announcing benefits, policies, current and unexpected events. Presently organizations often resort to bulletin boards, which are not remotely accessible, or phone chains, which are inefficient, unreliable, and labor-intensive.

Illustrated here with particular examples, these same considerations are generally applicable to any organization. Due to the mission-critical nature of these tasks, it is crucial that any equipment or method relating to substitute fulfillment, information compilation or notification be reliable and efficient. It is an advantage of the present invention to provide a reliable, efficient system and method of substitute fulfillment, information compilation and notification. It is a further advantage of the present invention to provide an automated system and method that has low overhead and requires little organization involvement or oversight. It is another advantage of the present invention to broaden the scope of system connectivity and to include an interface to the Internet. It is yet another advantage of the present invention to maintain a central database of related information and to share information across organizations. It is still another advantage of the present invention to provide trend analysis and reporting. An improved method of substitute fulfillment, information compilation and notification is useful to any organization that anticipates a need to assign replacement workers to fill temporary absences.

#### SUMMARY OF THE INVENTION

The present invention is directed to an automated system and method for performing substitute fulfillment for an organization that wishes to replace an employee during a temporary absence; performing placement of floating workers; tracking absences and entitlements of workers; notifying interested parties regarding

SECRET

unexpected events, daily announcements, policies and  
benefits; and bidding for temporary workers. Generally,  
at least one presently preferred embodiment of the  
present invention contemplates that a substitute  
5 fulfillment, information compilation or notification  
system includes a main server that manages substitute  
fulfillment, compilations and notifications for multiple  
client organizations. The server maintains substitute  
fulfillment data, contact data, notification information  
10 and other data centrally in a database for multiple  
client organizations employing the system. Organizations  
enter substitute fulfillment data and contact data  
locally at the organization and transmit the data to the  
server. An organization maintains its own parallel  
15 database on a local application. The system periodically  
sends updates to and receives updates from an  
organization's local database.

In one preferred embodiment, an employee  
registers an absence and triggers the automated  
20 substitute fulfillment procedure by contacting the  
substitute fulfillment system. In another preferred  
embodiment, a business entity, school or school district  
registers contact information and the system contacts the  
desired parties regarding unexpected events, benefits,  
25 policies or daily announcements. Yet another embodiment  
encompasses a system which tracks information regarding  
workers' absences and entitlements.

In at least one preferred embodiment, the  
system contacts the organization with the absence  
30 information. Once an absence is registered, the  
substitute fulfillment system uses the database to  
identify potential substitutes, temporary workers or

floating workers ("Substitutes") based on preferences or criteria selected by the organization and other information. The system then contacts the identified potential Substitutes to inquire regarding their availability. In a preferred embodiment, the system continues to contact potential Substitutes until one is found or until the list is exhausted and all potential Substitutes have refused the assignment.

If a Substitute accepts the assignment, the system relays instructions, key information and messages from the worker to the Substitute, if necessary. Whether or not a Substitute is successfully assigned, the system contacts the organization and other desired update recipients to report on the result. In at least one preferred embodiment, the system relies on multiple communications channels to ensure reliability.

The system may also track the absences of each particular worker and the worker's entitlements. Upon accessing the system, the worker or an administrator can inquire about the worker's absences and entitlements. The system stores the information on the absences and entitlements in the database.

In another embodiment, the system records announcements regarding unexpected or current events, benefits or policies when the system is accessed by an authorized party for this purpose. The system then contacts the interested parties regarding the announcement or allows the interested parties to access the announcement upon request. Additionally, if desired, the reports detailing the contacted parties and the

parties with which contact has been unsuccessful may be generated.

5 The invention may also be used to conduct auctions of idle temporary workers. The organization which requires temporary workers, may designate the skills and background required of the worker and the date and time for the position along with the price the organization is willing to pay. The system then fulfills these requests starting with the highest bidder.

10 It is understood that "workplace" or "organization" or "entity" when used in this application refers not only to more traditional work environments, but to any work environment amenable to substitute fulfillment, information compilation or notification,  
15 such as an employee unit that works cooperatively together within a larger organization, for example, an emergency services unit.

#### BRIEF DESCRIPTION OF THE DRAWINGS

20 The present invention and its presently preferred embodiments will be better understood by way of reference to the detailed disclosure hereinbelow and to the accompanying drawings, wherein:

25 Figure 1 is a block diagram showing a substitute fulfillment system in accordance with a preferred embodiment of the present invention.

Figure 2 is a data flow diagram showing the exchange of information between various entities involved in substitute fulfillment performed in accordance with a preferred embodiment of the present invention.

5           Figure 3 is a diagram showing an exemplary data structure of a worker record stored in accordance with a preferred embodiment of the present invention.

10           Figure 4 is a diagram showing an exemplary data structure of a client record stored in accordance with a preferred embodiment of the present invention.

            Figure 5 is a diagram showing an exemplary data structure of a list of pick-lists generated in accordance with a preferred embodiment of the present invention.

15           Figure 6 is a diagram showing an exemplary data structure of a school record stored in accordance with a preferred embodiment of the present invention.

            Figure 7 is a diagram showing an exemplary data structure of a county record stored in accordance with a preferred embodiment of the present invention.

20           Figure 8 is a diagram showing an exemplary data structure of a district record stored in accordance with a preferred embodiment of the present invention.

25           Figure 9 is a diagram showing an exemplary data structure of a user-preferences record stored in accordance with a preferred embodiment of the present invention.

Figure 10 is a diagram showing a list of available reports selectable by a user in accordance with a preferred embodiment of the present invention.

Figure 11 is a diagram showing an exemplary data structure for initial registration with a substitute fulfillment system in accordance with a preferred embodiment of the present.

Figure 12 is a representation of exemplary reports generated in accordance with a preferred embodiment of the present invention.

Figure 13 is a state diagram illustrating the operation of a computer-implemented system for performing substitute fulfillment in accordance with a preferred embodiment of the present invention.

Figures 14A-H depict a block diagram illustrating a data structure used for storing information in accordance with a preferred embodiment of the present invention.

## **DESCRIPTION OF THE PREFERRED EMBODIMENTS**

### **System Overview**

There is generally indicated at 10 in Fig. 1 a block diagram of a substitute fulfillment, information compilation or notification system in accordance with a preferred embodiment of the present invention. The main components of system 10 are a communications and processing server 30, connected to an Oracle™ server, or like database engine 34, a web server 36, and a report



processing unit 38, with multiple communication channels for clients, workers and potential replacements. Each unit or server may run on a separate computer or on the same computer as any of the other servers. The communications and processing server 30 manages the system 10, including managing communications interfaces and processing substitute fulfillment, information compilation or notification events. The central communications and processing server 30 also maintains the database 34, which contains data files with data records for multiple client organizations. The Oracle™ server maintains and stores the database. The Web Server manages and stores web pages accessible from the Internet. The Report Processing Unit generates data for the reporting requirements of the system.

The substitute fulfillment, information compilation or notification database 34 is depicted in Figures 14A-H and, more particularly, from data records 400 to 410. The states in which and between which the system operates are shown in Figure 13A-F.

The communications and processing server is connected to telephony hardware 32. Telephony hardware 32 preferably includes multiple phone lines with a connection 40 to a public telephone network 44. In a preferred embodiment, communications and processing server 30 is further connected to a router 29 with a connection 28 to the Internet, shown generally at 26. Preferably, communications and processing server 30 maintains at least two interfaces, most preferably two World Wide Web interfaces, for access to the substitute fulfillment system 10 via the Internet 26. The first such interface or web site is principally directed

towards client organizations 56 such as, for example, school districts. The second such interface or web site is principally directed toward workers 18 and potential replacement workers 22, such as, for example, teachers and substitute teachers.

Fig. 2 illustrates the flow of information in a preferred embodiment of the present invention. Maintaining the database and performing substitute fulfillment, information compilation and notification requires a periodic exchange of information between a client organization and the system; Fig. 2 illustrates a series of these steps.

A client organization 56 is required to have a computer 54 with Internet access 12. The Internet access 12 is preferably through a direct connection, but may alternatively be through a dial-up connection. In a preferred embodiment of the present invention, a potential customer organization 56 initially accesses the system 10 through the client organization web site in step 62. In step 70, the potential customer organization 56 obtains a copy of an introductory software applet of the present invention by downloading it from the web site. Alternatively, the potential customer organization may receive a copy of the introductory software applet through a different medium, such as a CD-ROM.

#### Registering for the System

In a preferred embodiment of the present invention, in step 64, once the potential customer organization accesses the web site and requests the applet, the communications and processing server first

sends the organization a registration "wizard." The wizard presents a series of interfaces to guide the organization through the registration process. Referring now to Figure 11, preferably, the registration wizard interface 250 requires that the organization submit identification 260 and billing information 258, for use primarily if the organization 56 later decides to enroll as a client with the system 10. In subsequent step 68, the system 10 next presents and requires that the potential customer organization 56 agree to licensing terms. After the information is provided in step 66, subsequently, the system 10 allows the organization 56 to download the applet to its own computer 54 in step 70.

In a preferred embodiment, until the organization 56 registers as a client organization, the organization 56 is entitled only to a trial use of the system 10 and is able to access only limited functionality of the applet and the system 10. For example, the organization 56 may only be able to use the applet to perform for a limited number of workers 18. If the organization 56 has not registered as a customer organization within a certain period, for example, 30 days, the applet expires and the organization 56 must reinitiate the process.

In a preferred embodiment, the applet resides locally on the client's computer 54 and functions independently of the main server 30 for most of its functions; an Internet connection 12 need not be maintained to run the applet, nor need Internet communications software be open. The applet is primarily a data entry and reporting and Internet communications tool. Once the organization 56 has

received the applet, in step 72, the organization must enter data to initialize the applet and the substitute fulfillment system 10 for its use.

In a preferred embodiment, the applet presents the client organization 56 with a series of forms to complete to build records which are key to substitute identification for each worker 18 or potential substitute 22, as well as other records necessary for ancillary tasks. Examples of other records include general customer information and reporting preferences. The applet is preferably tailored to collect data needed to perform substitute fulfillment in the work environment of the organization. For example, if the customer is a school, the applet may be tailored to collect data related to teachers, such as education background, certifications, schedules, and course information. The forms preferably conform to the data records that will be maintained by the communications and processing server 30 in the database 34. The applet may aid the client 56 in completing particular fields in the forms by providing drop-down lists with options for that field. There is shown in Figure 5 a sample data structure 150 of a list of possible pick-lists that the applet may generate. For example, a drop-down list may provide a list of all courses taught at the school so that the client can select the classes taught by a particular teacher to fill in that teacher's record. The applet may also fill in certain fields for the client 56 automatically by drawing on information stored in other records. For example, referring to Figures 3 and 6, once a school has completed a school data record 166, the applet may fill in the school contact information 176, 178, and 180 for each teacher affiliated with a particular school.

When the initial data entry is complete, in step 74, the customer instructs the applet to transmit the data to the communications and processing server 30 to initialize the system 10. The applet communicates with the communications and processing server 30 via the Internet. During step 76, the server operates in and transitions between the following states shown in Figure 13F: Wait (328), Import Object (329), Extract (330) and Send (331). The possible states of the client during step 76 include Extract (323), Send (324), Receive (325), Import (326) and Cleanup(327). The events used to invoke each of these states and to transition between the states are set forth in Figure 13F.

The applet preferably transmits and receives data in compressed format. Subsequently, in step 88, the applet routinely transmits updates of data stored in servers 34, 36 to the communications and processing server 10 on a schedule determined by the client 56 in step 74 and also when expressly directed to do so by the client 56 in step 74.

Once the communications and processing server 30 has been initialized with an organization's information, the information can subsequently be updated using the applet. New information is entered in client's database using the applet. When the applet communicates with the communications and processing server 30, the communications and processing server 30 automatically determines what information has been added or changed in the client's database since the last session and updates the same information in the central database 34. Thus, all information entered into the applet resides on both the organization's computer 54 and in the substitute

fulfillment database 34. Similarly, when the applet communicates with the communicating and processing server 30, the server 30 updates the applet regarding any activity that has occurred since the last communications session.

### Typical Data Records in the System

Figs. 3-10 illustrate a few types of data records that may be maintained and utilized in the database, particularly for a client that is a school. The data records provided illustrate what types of information the system 10 requires and how that information would typically be organized. In a preferred embodiment, the information in the data records is provided to the system 10 through the applet. Referring now to a preferred embodiment in Figure 3, teacher and substitute information stored in a staff data record 90, or data record 404, may include: name 92; title 94; social security number 96; a personal identification number (PIN) 98; billing information for billing substitute fulfillment services involving that teacher 100; certifications of the teacher 102; a list of teachers preferred to substitute for the teacher, or, alternatively, a list of criteria for selecting an appropriate substitute for the teacher 104; schedule information, preferably through a pop-up calendar 106, including work duties and absence information 108 (primarily for teachers) and availability 126 (primarily for substitutes); flags for special conditions 122, such as special instructions for a substitute or messages from a teacher to a substitute; affiliation information 112; contact information for the teacher 116; organization contact information for who to contact if that teacher

calls in an absence or a substitute fulfillment is performed 118; classroom location information 120; entitlement balances 124, for how many absences (sick days, personal days, etc.) a teacher has left for the school year; and call time preferences 128 (primarily for substitutes). The substitute schedule information is also stored in data record 403. The entitlement types are stored in data record 402. Referring now to Figure 4, for record-keeping, billing, and administrative functions, the database may store a business data record 130 with fields such as: the billing address 132 of the customer organization, its mailing address 134, billing contact 136, emergency contacts 138, phone numbers 140, fax numbers 142, electronic mail addresses 144, and options selected 148. It is understood that the fields shown are only representative of the fields that may be used within the scope of the present invention. Also, these fields may be further broken down into more specific subfields, for example, multiple mailing addresses or different emergency contacts for different times of day, week, month, or year. In this way, the system 10 maintains the information needed to perform substitute fulfillment, information compilation or notification for a particular organization 56. Other possible records are shown in Figures 5-10, and include records for pick-list management 150; for school data 166; for county data 190; for district data 202; for client preferences 226; and for reporting schemes 230. The skills for each worker that may be used as a substitute or may require substitute are recorded in data record 409, while the worker's personal identification number for accessing the system 10 is stored in data record 410. Data records 407 and 408 include the preferred skills of a potential substitute and the skills

of the actual substitute who accepts the position, respectively. The records maintained in the main database of the system 10 are preferably stored on the Oracle™ server 34.

5      Substitute Worker Fulfillment

Once the system 10 has been initialized, the system is ready to operate. No further specialized equipment need be set up at the local organization level. The substitute fulfillment operation is initiated when the system 10 identifies and schedules an absence in step 78. In the preferred embodiment of the present invention, the system may be notified of an absence in several ways in step 78. When a worker 18, 46 covered by the system 10 becomes aware of an absence, the worker 18, 46 may contact the communications and processing server 30 by telephone 48, preferably through a toll-free number. Using keys on the standard telephone keypad, the worker 18, 46 identifies himself and enters the details of his pending absence. The skills required of a substitute are stored in data record 405. Alternatively, the worker 18, 46 may contact the communications and processing server 30 via the Internet 26, possibly using a home-based computer 20, through a worker web site which is preferably secure. The information regarding the pending absence is stored in data record 401. In addition to providing information regarding his upcoming absence, the worker 18, 46 may also record or transmit a message directed to the substitute 20. In one



embodiment, if the worker 18, 46 notifies the organization 56, rather than the system 10, of the absence directly, the organization 56 may simply update its applet and connect to the communications and processing server 30, which process will automatically update the communications and processing server database 34, notify the substitute fulfillment system 10 of the absence, and trigger the substitute fulfillment process.

In step 78, the worker calls into the system and indicates the pending absence(s) and the information is stored in data record 401. The entitlement information regarding a pending absence is stored in data record 406. The server operates in the states shown in Figure 13A, including Initial(281), MainMenu (282), Whenstep1 (283), WhenAnotherDay (284), Shift (285), StartTime (286), AbsenceType (287), RecordInstructions (288), ConfirmAbsence (289), CheckComplete (290), Entitlements (291), ErrorState (292), Hangup (293), and Goodbye (294), and the events which invoke these states are also described in Figure 13A. For example, Generate Start Event signifies returning to the first action of the phonecall, preferably to replay a greeting or a request for an identification number. MainMenu (282) prompts the worker to push 1 on the telephone if the worker desires to record an absence, 2 to listen to entitlement day balances, including but not limited to vacation, personal and sick days remaining, and 3 for special instructions regarding a particular workplace. In Shift (285), if the worker's absence will not begin at the start of the work shift, the system proceeds to StartTime (286), during which worker is prompted for the start time of the absence. The worker is prompted to designate an absence type, which types have been designated by the Client, in

state 287. In Entitlements (291), "List Entitlement Day Balances" signifies notifying the worker of entitlements, including but not limited to, used and remaining vacation, sick and personal days.

5 In step 80, the system 10 distributes absence notifications to relevant client personnel 14, 50, preferably on a regular basis at a time specified in advance by the client 56. Referring now to Fig. 12, notifications may take the form of summary absence reports 276. The information for the absence reports is stored on data record 400. For example, the server 30 may transmit a summary absence report 276 for each workday at 5:00 p.m. on the previous day and again at 7:00 a.m. that day to selected client personnel. Summary absence reports 276 may be distributed by facsimile 52, electronic mail 16, or via the applet to any parties designated by the client 56 as "need-to-know" parties 14, 50 for all absences or for particular absences. Notification preferences are stored within the communications and processing server 30. In a preferred embodiment, designated client personnel 14, 50 receive both an absence notification via electronic mail 16 as soon as the absence is registered and a summary absence report 276 via facsimile 52 at a pre-set time. Use of multiple communications channels builds additional reliability into the system 10.

In step 81, the substitute fulfillment system 10 identifies potential replacements 22 for the absent worker 18, 46. The organization 56 typically has a pool of potential replacements 22 available to it. If the organization 56 has chosen to identify particular replacements 22 suitable for a particular worker 18, 46,

then the substitute fulfillment system 10 may simply locate that list. Alternatively, if the organization 56 has identified only qualifications or criteria for selecting an acceptable replacement 22 for a particular worker 18, 46, then the substitute fulfillment system 10 may compile a list by searching for potential replacements with the requisite qualifications in a master list of replacements 22 available to the organization located in the database 34. In a preferred embodiment, the substitute fulfillment system 10 may compile a list of preferred replacements and a back-up list of acceptable replacements.

In step 82, the server 30 then contacts potential replacements 22, preferably via telephone 32, 40, 42 and 44, using interactive voice response technology (suitable equipment includes Dialogic™ Model D-41ESC and D-240 product line) that interfaces logically with callers, usually employing a set of pre-recorded prompts, a database, and dynamic selection criteria. The number called, and the caller identification are recorded in data record 411. The server operates during step 82 in the states including MakeTheCall (308), CallAnalysis (309), Identify (310), PresentRequest (311), RejectRequest (312), AcceptRequest (313), ErrorState (314), Hangup (315) and Goodbye (316), which are displayed in Figure 13D. The invoking events for each of these states are set forth in Figure 13D, and examples of these events follow: In Identify (310), the potential replacement is prompted for an identification number. In PresentRequest (311), the request is played and the potential replacement is prompted for 1 to replay the request, 2 to accept and 3 to reject. Further, the potential replacement is prompted for 1 to reject future

requests, or 2 to allow additional requests to be phoned to the potential replacement, in RejectRequest (312). If the potential replacement accepts the request, a confirmation number is played in AcceptRequest (313).

5           The system 10 will call qualified replacements 22 over a period of time until one of the qualified replacements accepts the substitute assignment in step 84 or the list of potential replacements 22 is exhausted. If multiple lists of potential replacements have been  
10       compiled, the system 10 will first search the list of preferred replacements before resorting to secondary lists. The client organization 56 may specify appropriate call times and other parameters for the Interactive Voice Response technology.

15           If a substitute 22 accepts the assignment, the server 30 may relay instructions from the organization 56 or messages from the absent worker 18 to the substitute. Referring now to Figure 12, the system 10 then generates summary absentee reports 276, summary substitute  
20       assignment reports 278, call history reports 279, and unfulfilled substitute assignment reports 280 with the details of any successful replacement, all calls made, and information regarding any vacancy that could not be filled. The information for said reports is stored in  
25       data record 400. In step 86, the server 30 distributes to organization personnel 14 designated for receipt of the reports. Clients 56 may specify different personnel distribution lists for various reports. Reports may be mailed electronically or faxed, or both by server 30.

30           Because the applet is updated each time the communications and processing server 30 is accessed, the

applet will typically contain an accurate history of system use and may also be used for local reporting and review of historic substitute fulfillment system operation data. In a preferred embodiment of the present invention, all desired transaction information, including all absence notifications, substitute requirements, substitute fulfillment attempts, substitute fulfillment successes and failures, web site accesses, employment searches by substitutes, etc., are stored in the database 34.

#### List of Opportunities for Replacement Workers

In a preferred embodiment, using the information in the database 34, the server 30 may also generate a listing of opportunities for replacement workers 22 and make the listing available through a web site interface. Replacement workers 22 may access the site and select an assignment. If the same assignment is currently being processed or waiting to be processed by the system's (10) Interactive Voice Technology, then the assignment selection is recognized, further processing is halted, and appropriate reports generated. Data record 400 stores the information for said reports.

The server 30 is capable of handling multiple clients 56 and multiple substitute fulfillment tasks simultaneously. Because the system 10 is centralized, services multiple customers 56, and maintains a database 34, including historical system use information, the system 10 of the present invention provides special opportunities to match substitutes across organizations 56, to aggregate data and to review trends. In a preferred embodiment, the server 30 and database 34 track

substitute fulfillment data globally, identify opportunities for inter-organization substitute referral or fulfillment, and report on substitute fulfillment needs and other trends. The report information is stored in data record 400. For example, the server 30 may identify substitute teachers registered in a district adjacent to a customer school district and inform the customer school district. In another example, the substitute fulfillment system may identify hot spots where substitutes with particular qualifications are in demand.

#### Notification System of an Unexpected Absence

In a preferred embodiment, the invention may be used to notify designated groups of people of an absence over the telephone. The client in this embodiment is an organization including but not limited to school or business entity. The data records may contain information related to contact information for each student in the school's body or each worker, including but not limited to, phone numbers and email addresses of parents' and guardian's, student's classes, and student's year. In step 78, the system 10 receives phone calls and emails regarding the absence. Information regarding the call, including the number called is stored at data record 411. In step 78, the server transitions between the states shown in Figure 13C, which included RecordFilesMenu (303), RecordFiles (304), ErrorState (305), Goodbye (306) and Hangup (307). These states are invoked by the events set forth in Figure 13C, and several example events follow. The caller is prompted for the recording ID, in order prevent an unauthorized recording in RecordFilesMenu (303). In RecordFiles

(304), if caller presses 1 on the telephone, the system 10 prompts the caller to record a new recording or to verify that the existing recording is acceptable.

5 The system 10 distributes notifications of absence to interested parties, including but not limited to, administrators or managers. These notifications may be in the form of summary absence reports distributed by facsimile 52, electronic mail 16, or via telephone to any parties designated by the client 56 as a contact person 10 for all absences or for particular absences, including absences for a particular class year.

15 In step 82, the server 30 may then contact the persons listed in the contact information ("contacts") for each absent student or worker, including but not limited to parents and guardians, preferably via telephone 32, 40, 42 and 44. The system 10 will call the contacts in order to receive an acknowledgement that the student or worker is absent for an acceptable reason. If the list of particular contacts for the student or worker 20 is exhausted in step 86, the designated personnel in the organization receives a report of unacknowledged absences from the server 30.

#### Notification System of an Unexpected Event

25 In another preferred embodiment, the invention may be used to notify designated groups of people over the telephone of an unexpected event. The client in this embodiment includes but is not limited to a school, school district, or business entity. The data records, in a preferred embodiment, contain information related to 30 contact information for each student or worker of the

client's, including but not limited to, phone numbers for workers, parents, and guardians, email addresses, student's classes, student's grade, and the content of the message representing the unexpected event.

5           The system 10 receives a phone call or email regarding an unexpected event or announcement of the client, and records a new message regarding the unexpected event or announcement. The server then operates in and transitions between the states shown in  
10   Figure 13B, which include MainMenu (295), RecordSchoolMenu (296), RecordSchool (297), Record EntTypesMenu (298), RecordEntTypes (299), ErrorState (300), Goodbye (301), and Hangup (302). The events which invoke and transition between these states are shown in  
15   Figure 13B.

          In step 82, the server 30 then contacts the persons listed in the contact information for each affected student or worker, including but not limited to parents and guardians, preferably via telephone 32, 40,  
20   42 and 44, to notify the contacts of the event or announcement. If the list of potential contacts for the worker or student is exhausted, in step 86, the designated personnel in the entity or school receives a report of unacknowledged event announcements from the  
25   server 30.

          The system 10 distributes notifications of the contacts. These notifications may be in the form of summary event reports distributed by facsimile 52,  
30   electronic mail 16, or via the applet to any parties designated by the client 56 as a contact person for all



events or for particular events. All information for the reports is stored in data record 400.

#### System for Recording Daily Announcements

5 In another preferred embodiment, the invention may be used to notify designated groups of people over the telephone of daily announcements, including but not limited to school menus. The client in this embodiment is a school, school district, or business entity.

10 In this embodiment, the server operates in and transitions between the states shown in Figure 13B, which include MainMenu (295), RecordSchoolMenu (296), RecordSchool (297), RecordEntTypesMenu (298), RecordEntTypes (299), ErrorState (300), Goodbye (301), and Hangup (302). The events which invoke and transition  
15 between these states are shown in Figure 13B. For example, the system 10 prompts the caller in MainMenu (295) to enter 1 to reach the RecordSchoolMenu, in order to record an announcement and 2 to reach the RecordEntTypes Menu, in order to record a message  
20 regarding entitlement types. Information regarding entitlement types is stored in data record 402. In RecordSchoolMenu (296), the caller is prompted for the valid school recording identification, which prevents unauthorized recordings, and similarly in  
25 RecordEntTypesMenu 298, the caller is prompted for the valid Entitlement Type Recording ID, which prevents unauthorized recordings. In RecordSchool (297) and RecordEntTypes (299), if caller presses 1 on the telephone, the system 10 prompts the caller to record a  
30 new recording or to verify that the existing recording is acceptable.

## Notification System of Patient-Related Information

The invention, in another preferred embodiment, may be used to notify doctors of important patient related information, e.g., patient tests, and patient status. The system 10 receives phonecalls and emails regarding the patient related information. The system 10 distributes notifications of the information via voice recorded messages that are announced to many doctors at once using the contact data for the relevant doctors.

## Substitute Teller Fulfillment System

In another preferred embodiment, the invention may be used to fulfill the substitute teller requirements in a retail bank. The client in this embodiment is a retail bank or branch office. The data records may contain information related to contact information for each substitute teller, including but not limited to, phone numbers, email addresses, and qualifications. The system 10 receives a phone call or email regarding an absence of a teller, and the information regarding this absence is stored in data record 401. In step 82, the server 30 then contacts the potential substitute tellers, preferably via telephone 32, 40, 42 and 44. During step 82, the server proceeds in and transitions between the states in Figure 13D, which include MakeTheCall (308), CallAnalysis (309), Identity (310), Present Request (3110, RejectRequest (312), AcceptRequest (313), ErrorState (314), Hangup (315) and Goodbye (316). The events which invoke these states and transitions between the states are set forth in Figure 13D. Provided the system was able to contact the substitute teller, the

substitute teller is able to accept or reject the position.

Alternatively, the client may have a pool of floating tellers, who fill the vacancies in the bank in a given day. The server 30 then contacts the floating tellers, preferably by telephone, email, or facsimile to inform the floating teller to report to a particular branch office. If the server 30 attempts to contact the floating tellers via facsimile, the server 30 proceeds in and transitions between the states set forth in Figure 13E. The possible states of the server include MakeTheCall (317), CallAnaylsis (318), FaxSend (319), ErrorState (320), Goodbye (321) and Hangup (322). Figure 13E sets forth the events which trigger these states and the transitions between these states.

Upon acceptance by a substitute teller or floating teller or exhaustion of the list of substitute tellers or floating tellers, the system 10 generates reports detailing who is absent, who was contacted regarding the position, who has accepted the position and the qualifications of the substitute or floating teller. The information compiled in the reports is stored in data record 400.

#### Worker Substitute Fulfillment System

The invention, in another preferred embodiment, may be used to fulfill the substitute worker requirements for workers, including but not limited to, fire police, ambulance workers, waitstaff, cooks, bus boys, cashiers, sales people, production line workers, pilots and stewards. The data records may contain information

related to contact information for each substitute worker, including but not limited to, phone numbers, email addresses, and qualifications, and the shifts worked by the workers. The system 10 receives a  
5 phonecall or email regarding an absence of a worker, and store this information in data record 401. In step 82, the server 30 then contacts the potential substitute workers, who are not working the specified shift, preferably via telephone 32, 40, 42 and 44. Provided the  
10 system was able to contact the substitute worker, the substitute worker is able to accept or reject the position. In step 82, the server 30 then contacts the potential substitute tellers, preferably via telephone 32, 40, 42 and 44. During step 82, the server proceeds  
15 in and transitions between the states in Figure 13D, which include MakeTheCall (308), CallAnalysis (309), Identity (310), Present Request (311), RejectRequest (312), AcceptRequest (313), ErrorState (314), Hangup (315) and Goodbye (316). The events which invoke these  
20 states and transitions between the states are set forth in Figure 13D. Provided the system was able to contact the substitute worker, the substitute worker is able to accept or reject the position.

#### Temporary Worker Agency Fulfillment System

25 In another preferred embodiment, the invention may be used to fulfill the substitute worker requirements through a temporary worker agency. This embodiment of the invention may be used to find replacements for material moving and equipment operators, nurses, doctors,  
30 x-ray technicians, physical therapy workers, and surgical assistants. The client in this embodiment is a temporary worker agency. The data records may contain information

related to contact information for each substitute worker, including but not limited to, phone numbers, email addresses, particular position sought and qualifications. The system 10 receives a phone call or email from a customer of the client designating the position to be filled, and the information is stored in data record 401. Additionally, the absent worker of the client's customer may directly contact the system 10 preferably via telephone or email.

In step 82, the server 30 then contacts the potential substitutes with the requisite qualifications, preferably via telephone 32, 40, 42 and 44. Provided the system was able to contact the substitute, the substitute is able to accept or reject the position. During step 82, the server proceeds in and transitions between the states in Figure 13D, which include MakeTheCall (308), CallAnalysis (309), Identity (310), PresentRequest (311), RejectRequest (312), AcceptRequest (313), ErrorState (314), Hangup (315) and Goodbye (316). The events which invoke these states and transitions between the states are set forth in Figure 13D.

The system 10 generates reports detailing who is absent, who was contacted regarding the position, who has accepted the position and the qualifications of the substitute. According the client's instructions, these reports may be sent to the client and the client's customers. Reports may be customized to show the information required by each of the client's customers, said information in data record 400.

### Notification System for Union Policies and Benefits

5 In another preferred embodiment, the invention  
may be used to notify union members of policies and  
benefits. The client is a union or unionized  
organization. The data records may contain information  
related to contact information for each member, including  
but not limited to, phone numbers, email addresses,  
position and employer. The system 10 receives a phone  
call or email from the client designating new policies or  
10 benefits for union members, or business matters for the  
union. In step 82, the server 30 then contacts the  
members who are affected by the policies, benefits or  
business matters, preferably via telephone 32, 40, 42 and  
44. The system 10 generates reports detailing who was  
15 successfully and unsuccessfully contacted.

### System for Recording Absences and Entitlements

20 In another preferred embodiment, the invention  
may be used to record absences for a business entity.  
The client is a business entity, such as a corporation.  
The data records may contain information related to  
contact information for each worker, including but not  
limited to, phone numbers, email addresses, position and  
entitled vacation, sick and personal time. The system 10  
receives a phone call or email from a worker designating  
25 an absence and reason for the absence, including but not  
limited to sick time, vacation time and personal time,  
and stores the information in data record 401. The  
system 10 generates reports from data record 400  
detailing who is absent, and the absent worker's record  
30 for absences including the type of absence. These

reports may include sick time, vacation time and personal time used and remaining.

#### System for Idle Temporary Worker Auctions

5 In another preferred embodiment, the invention may be used to allow different clients to bid for temporary workers. The client would designate the required skills and pertinent information for the temporary worker, e.g., the required degrees, the required experience, the geographical location of the position and the dates of the position. Additionally, 10 the client would designate how much it was willing to pay for the temporary worker. The system 10 then processes all requests for temporary workers for the date and time required and fulfills the requests based upon the highest bidder receiving the most qualified temporary worker for 15 the position first, then the next highest bidders request is fulfilled and so on until all requests are fulfilled or no acceptable temporary workers are available.

#### System Back-ups

20 In a preferred embodiment, the system 10 has at least one offsite operational backup site. The communications and processing server and related equipment may also be supplied with a fossil-fuel powered generator for a back-up power supply.

25 If not otherwise stated herein, it may be assumed that all components, modes of communication, and/or processes described heretofore may, if appropriate, be considered to be interchangeable with similar components, modes of communication, and/or

processes disclosed elsewhere in the specification,  
unless an express indication is made to the contrary.

Although the invention has been described in  
detail for the purpose of illustration, it is to be  
understood that such detail is solely for that purpose  
and that numerous modifications, alterations and changes  
can be made therein by those skilled in the art without  
departing from the spirit and scope of the invention  
except as it may be limited by the claims. All changes  
which come within the meaning and range of equivalency of  
the claims are to be embraced within their scope.



What is claimed is:

1. A computer-implemented substitute fulfillment system that identifies and secures substitute workers for a plurality of different organizations, comprising:

a central server that processes information associated with a plurality of different organizations;

a central database coupled to the central server, the central database including records that store substitute fulfillment data associated with each of the plurality of different organizations, wherein for each of the different organizations the fulfillment data includes worker records representing workers that may be absent from the organization and substitute worker records representing substitute workers that may be used to fill a position of an absent worker;

a plurality of local processors that are remote from the central server, each of the local processors being associated with one of the different organizations and having a separate local database coupled thereto, wherein each local database is associated with one of the different organizations and includes worker records representing workers that may be absent from the organization and substitute worker records representing substitute workers that may be used to fill a position of an absent worker;

wherein said organizations comprise one or more of schools, school districts, retail banks, branch offices

of banks, convenience stores, manufacturing facilities, fire departments, police departments, hospitals, transportation departments, schools, school districts, airlines and temporary worker agencies;

5            wherein the central database maintains each of the records on each local database in parallel with a corresponding record on the central database by periodically updating the records on the local databases in response to data changes on the central database, and  
10           wherein each local database maintains records on the central database in parallel with corresponding records on the local database by periodically updating the records on the central databases in response to data changes on the local database;

15           at least one telephone communication link coupled to the central server, wherein the telephone communication link provides information representing absent workers to the central server, the central server identifies one or more of the substitute workers in response to the  
20           information representing absent workers, and the central server communicates information representing positions to be filled to substitute workers via the telephone communication link or an internet communication link; and

25           wherein the central server periodically transmits reports that include absentee and substitute information to each of the different organizations via the telephone communication link or the Internet communication link.

2. A computer-implemented absence and entitlement recording system that records and monitors workers'

absences for a plurality of different organizations,  
comprising:

a central server that processes information  
associated with a plurality of different organizations;

5 a central database coupled to the central server,  
the central database including records that store worker  
data associated with each of the plurality of different  
organizations, wherein for each of the different  
10 organizations the worker data includes worker records  
representing workers that may be absent from the  
organization and worker records representing cumulative  
absences, a type of each absence and remaining time  
allowed for absences;

15 a plurality of local processors that are remote from  
the central server, each of the local processors being  
associated with one of the different organizations and  
having a separate local database coupled thereto, wherein  
each local database is associated with one of the  
20 different organizations and includes worker records  
representing workers that may be absent from the  
organization and worker records representing cumulative  
absences, the type of each absence and remaining time  
allowed for absences;

25 wherein the central database maintains each of the  
records on each local database in parallel with a  
corresponding record on the central database by  
periodically updating the records on the local databases  
in response to data changes on the central database, and  
wherein each local database maintains records on the  
30 central database in parallel with corresponding records

on the local database by periodically updating the records on the central databases in response to data changes on the local database;

at least one telephone communication link coupled to the central server, wherein the telephone communication link provides information representing absences and entitlements to the central server, the central server tracks absences and entitlements, and the central server communicates information representing absences and entitlements via the telephone communication link or an internet communication link; and

wherein the central server periodically transmits reports that include absentee information to each of the different organizations via the telephone communication link or the Internet communication link.

3. A computer-implemented unexpected event notification system that notifies one or more members of a designated group of an unexpected event of one or more organizations, comprising:

a central server that processes information associated with a plurality of different organizations;

a central database coupled to the central server, the central database including records that store contact data associated with each of the plurality of different organizations, wherein for each of the different organizations contact data includes contact records for persons interested in the notifications;

a plurality of local processors that are remote from the central server, each of the local processors being associated with one of the different organizations and having a separate local database coupled thereto, wherein  
5 each local database is associated with one of the different organizations and includes records representing contact information associated with each of the interested persons;

wherein the central database maintains each of the  
10 records on each local database in parallel with a corresponding record on the central database by periodically updating the records on the local databases in response to data changes on the central database, and wherein each local database maintains records on the  
15 central database in parallel with corresponding records on the local database by periodically updating the records on the central databases in response to data changes on the local database;

at least one telephone communication link coupled to  
20 the central server, wherein the telephone communication link provides information representing an unexpected event to the central server, the central server identifies one or more members to notify regarding the unexpected event, and the central server communicates  
25 information representing the closing via the telephone communication link or an internet communication link; and

wherein the central server periodically transmits reports that include contact information to each of the different organizations via the telephone communication  
30 link or the Internet communication link.

4. A computer-implemented notification system that notifies one or more members of one or more unions regarding policies, benefits and business matters, comprising:

5 a central server that processes information associated with a plurality of different unions;

10 a central database coupled to the central server, the central database including records that store contact data associated with each of the plurality of different unions, wherein for each of the different unions, contact data includes contact records representing means of contacting members of the unions;

15 a plurality of local processors that are remote from the central server, each of the local processors being associated with one of the different unions and having a separate local database coupled thereto, wherein each local database is associated with one of the different unions and includes contact records representing contact information associated with each of the members;

20 wherein the central database maintains each of the records on each local database in parallel with a corresponding record on the central database by periodically updating the records on the local databases in response to data changes on the central database, and  
25 wherein each local database maintains records on the central database in parallel with corresponding records on the local database by periodically updating the records on the central databases in response to data changes on the local database;

SECRET - 9926460

at least one telephone communication link coupled to the central server, wherein the telephone communication link provides information regarding policies, benefits and business matters, the central server identifies one or more of the members to notify regarding the information, and the central server communicates the information via the telephone communication link or an internet communication link; and

wherein the central server periodically transmits reports that include contact information to each of the different unions via the telephone communication link or the Internet communication link.

5. A computer-implemented substitute fulfillment system that identifies and places floating workers for a plurality of different organizations, comprising:

a central server that processes information associated with a plurality of different organizations;

a central database coupled to the central server, the central database including records that store substitute fulfillment data associated with each of the plurality of different organizations, wherein for each of the different organizations the fulfillment data includes worker records representing workers that may be absent from the organization and floating worker records representing floating workers that may be used to fill a position of an absent worker;

a plurality of local processors that are remote from the central server, each of the local processors being associated with one of the different organizations and

having a separate local database coupled thereto, wherein each local database is associated with one of the different organizations and includes worker records representing workers that may be absent from the organization and floating worker records representing floating workers that may be used to fill a position of an absent worker;

wherein the central database maintains each of the records on each local database in parallel with a corresponding record on the central database by periodically updating the records on the local databases in response to data changes on the central database, and wherein each local database maintains records on the central database in parallel with corresponding records on the local database by periodically updating the records on the central databases in response to data changes on the local database;

at least one telephone communication link coupled to the central server, wherein the telephone communication link provides information representing absent workers to the central server, the central server identifies one or more of the floating workers in response to the information representing absent workers, and the central server communicates information representing positions to be filled to floating workers via the telephone communication link or an internet communication link; and

wherein the central server periodically transmits reports that include absentee and floater information to each of the different organizations via the telephone communication link or the Internet communication link.



6. A method of performing substitute fulfillment by finding substitutes for absentee workers in an organization, comprising the steps of:

5 providing an automated substitute fulfillment system remote from said organization;

10 wherein said organization is one or more of the group comprising schools, school districts, retail banks, branch offices of banks, convenience stores, manufacturing facilities, fire departments, police departments, hospitals, transportation departments, schools, airlines and temporary worker agencies;

15 initializing said substitute fulfillment system by creating a main database of stored substitute fulfillment data records;

20 notifying said substitute fulfillment system of a worker absence;

automatically identifying potential substitute workers using said substitute fulfillment system;

20 automatically contacting potential substitute workers serially and relaying a replacement request until one potential substitute agrees to cover said absence or until said list is exhausted;

notifying personnel in said organization of the results.

7. A method of performing absence and entitlement recording by recording and monitoring worker's absences in an organization, comprising the steps of:

providing an automated absence and entitlement recording system remote from said organization;

initializing said absence and entitlement recording system by creating a main database of stored worker data records;

notifying said absence and entitlement recording system of a worker absence;

automatically recording an absence and entitlement of the worker and type of absence;

automatically generating a tally of one or more of the group comprising used sick time, vacation time and personal time, and available sick time, vacation time and personal time;

notifying personnel in said organization of the results.

8. A method of performing unexpected event notification by notifying one or more members of a designated group, comprising the steps of:

providing an automated unexpected event notification system remote from said organization;

initializing said notification system by creating a main database of stored contact data records;

notifying said notification system of an unexpected event;

automatically identifying members to be notified by said notification system;

5 automatically notifying identified members;

notifying personnel in said organization of the results.

9. A method of performing notification of one or more members of one or more unions regarding policies, benefits and business matters, comprising the steps of:

providing an automated notification system remote from said organization;

initializing said notification system by creating a main database of stored contact data records;

15 notifying said system of one or more of a policy, benefit and business matter;

automatically identifying members who should be notified by said system;

automatically notifying identified members;

20 notifying personnel in said organization of the results.

10. A method of performing substitute fulfillment by finding floating workers for absentee workers in an organization, comprising the steps of:

5 providing an automated substitute fulfillment system remote from said organization;

initializing said substitute fulfillment system by creating a main database of stored floating workers fulfillment data records;

10 notifying said floating worker fulfillment system of a worker absence;

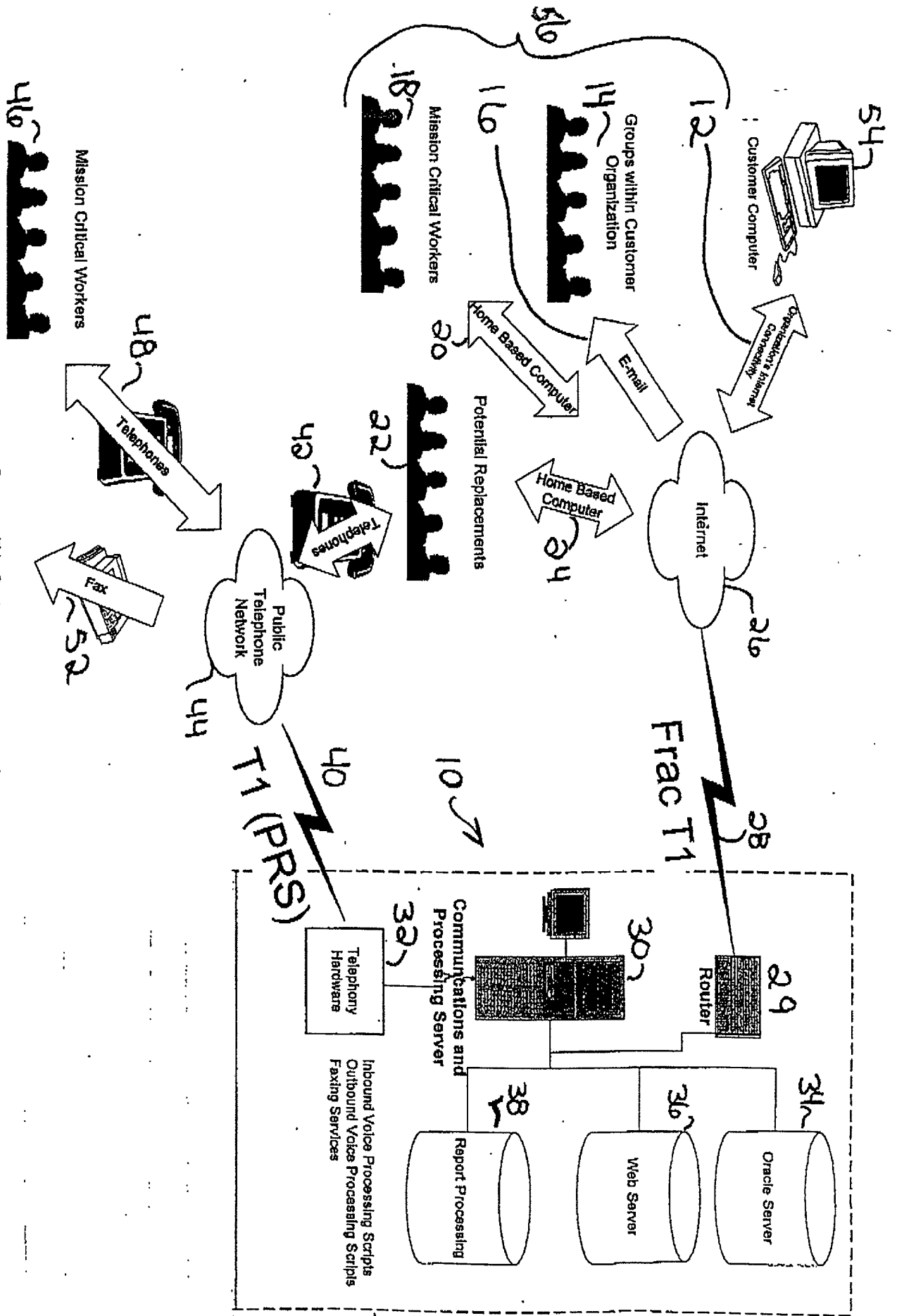
automatically identifying floating workers who should be notified by said system;

automatically contacting a floating worker and relaying absent worker's position and location;

15 notifying personnel in said organization of the results.

### ABSTRACT OF THE DISCLOSURE

A system and method for automating the performance of substitute fulfillment to assign a replacement worker to substitute for a worker during a temporary absence, performing placement of floating workers, tracking absences and entitlements of workers, notifying interested parties regarding unexpected events and daily announcements, and bidding for temporary workers. Substitute fulfillment, contact, absence, entitlement and notification data is stored centrally in a database on a server at a common site for multiple organizations employing the substitute fulfillment or notification system. When a worker absence is indicated, the system searches the database to obtain a list of potential replacements for the absent worker and tracks the worker's absences and entitlements. The system contacts potential replacements until one is found or until the list is exhausted. The system generates suitable reports and notifies organization personnel of any activity. The system also records announcements regarding unexpected or current events and contacts the interested parties of an organization with these announcements. The system stores and aggregates historical operation data, prepares reports and provides relevant services.



F-19-1

004419266-101599

# Data Flow Process and Interfaces

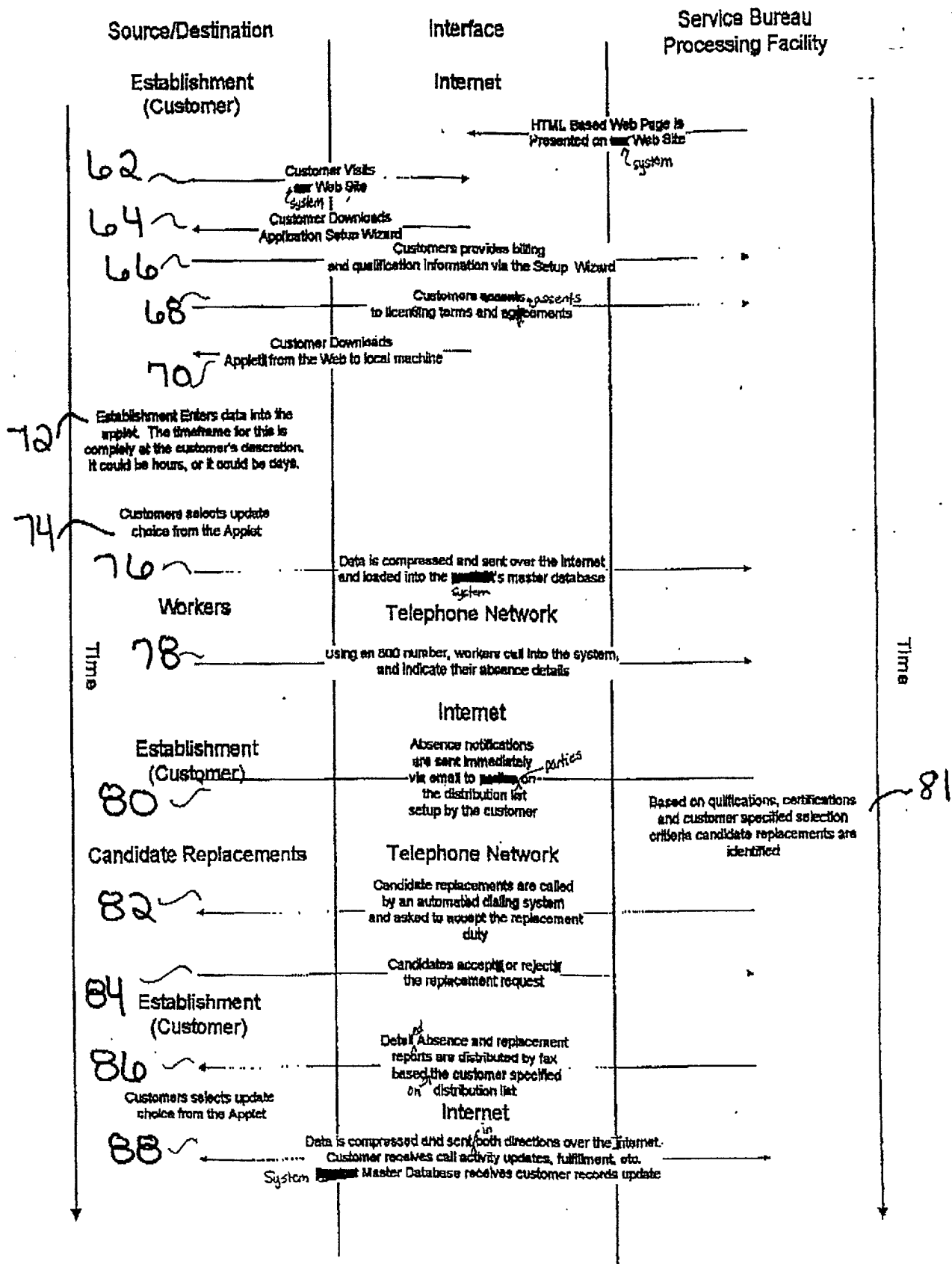


Fig. 2

Figure 3

90 →

STAFF	
Name	- 92
Title	- 94
Social Security Number	- 96
Pin	- 98
Cross reference to billing contact	- 100
Certification(s)	- 102
Substitute preferences	- 104
Schedule manipulation	- 106
Absence record	- 108
School reference	- 110
District reference	- 112
County reference	- 114
E-mail address	- 116
Fax number	- 118
Room/Office number	- 120
Special flag for recorded messages	- 122
Entitlement balances	- 124
Availability	- 126
Call time preferences	- 128

665101-9900460



Figure 4

130 →

Business Data	
Billing address	- 132
Mailing address	- 134
Billing contact	- 136
Emergency contact Evening Weekend Business	- 138
Phone number	- 140
Fax number	- 142
E-mail	- 144
PO #	- 146
Options turned on	- 148

Figure 5

150 ↗

Pick-Lists	
Field preferences	
Required	-152
Visible	
Default data	
Field data	
Type	-154
Certification	-156
Entitlement types	-158
People	-160
Schools	-162
District	-164

Figure 6

166 →

School Data	
Name	- 168
Code	- 170
Type	- 172
Principal	- 174
Fax	- 176
Assign fax list	- 178
Phone	- 180
Secretary	- 182
Assign substitute	- 184
Assign staff	- 186
Record/Play	- 188

Figure 7

190 →

County Data	
Name	- 192
Code	- 194
State	- 196
Associate districts	- 198
Assign substitutes	- 200

Figure 8

202 →

District Data	
Name	- 204
Code	- 206
District address	- 208
Phone	- 210
Fax	- 212
Assign fax list	- 214
Administrator/Board secretary	- 216
Associate schools	- 218
Assign substitutes	- 220
Assign staff	- 222
Record/Play	- 224

Figure 9

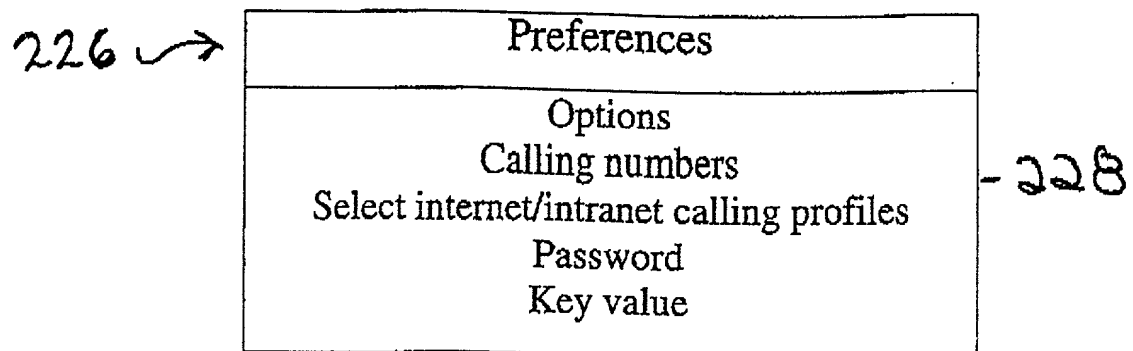


Figure 10

230 →

Reports	
Acceptance/refusal history	-232
Call History	-234
Unfulfilled	-236
Teacher manifest Trend analysis	-237
Substitute manifest	-238
School manifest	-240
Substitute performance Acceptance rating Flexibility rating Trend analysis	-242
Staff attendance	-244
Staff calendars	-246
Assignment reports School District County	-248

Figure 11

250



Wizard	
Phone	- 252
Emergency phone	- 254
Contact	- 256
Billing address	- 258
District	- 260
Title	- 262
Number of teachers (approx.)	- 264
Number of support staff (approx.)	- 266
Fax number	- 268
E-mail address optional	- 270
Billing contact optional	- 272

**ABSENTEE REPORT**

DATE: 1/8/98

TIME: 14:40:08

276 —

Name	Social Security#	Phone #	Title	Time	Location
Smith, John, T.	005-75-2243	(609)-555-1111	Social Studies	14:39:50	Howard
Date:	1/8/98				
Type:	Sick				
F/H Day:	Half Day/PM				

**SUBSTITUTE ASSIGNMENT REPORT**

DATE: 1/8/98

TIME: 17:08

278 —

Name: Smith, John, T.  
Title: Social Studies gr 8  
Location: Howard

SSN: 005-75-2243  
School ID: 011  
School: 50 South School Street

Substitute Information  
Name: Smith, Charles  
Contact Date: 1/8/98

SSN: 005-76-2214  
Time: 17:06

**CALL HISTORY REPORT**

DATE: 1/8/98

TIME: 17:08

279 —

Name: Smith, John, T.	SSN: 005-75-2243		
Date: 1/8/98	Time: 17:04	Line: Answer	Status: No Contact Sub: Smith, Mark, C.
Date: 1/8/98	Time: 17:05	Line: Answer	Status: Rejected Sub: Jones, Pat, B.
Date: 1/8/98	Time: 17:06	Line: Answer	Status: Accepted Sub: Smith, Charles, D.

**UNFULFILLED SUBSTITUTE ASSIGNMENT REPORT**

DATE: 1/8/98

TIME: 19:10

280 —

Name: Hitchens, Jack, R.  
Title: English gr 11  
Location: Blair

SSN: 008-75-2278  
School ID: 012  
School: 123 South Main Street

Fig. 12



Figure 13A

States	Events					
ST = State Transition	Start	Receive a call	Receive Valid Input	Receive Invalid Input	Timeout	Max Retries Reached
Telephony Application						
Teacher Call-in						
Initial	Prompt for SS Number	Take phone offhook; Generate "Start" Event	ST: MainMenu	ST: ErrorState	ST: Hangup	N/A
MainMenu	"1"Record Absence; "2"Listen to Entitlement Day Balances; "3"Special Instructions	N/A	"1"Pressed ST: Whenstep1; "2"Pressed, Entitlements	Play Error Message; Generate Start Event	Play Error Message; Generate Start Event	ST: Goodbye
Whenstep1	"1" Today; "2"Another Day	N/A	"1" ST: Shift; "2" ST: WhenAnotherDay	Play Error Message; Generate Start Event	Play Error Message; Generate Start Event	ST: Goodbye
WhenAnotherDay	Prompt for day of the month followed by the "#" sign	N/A	ST: Shift	Play Error Message; Generate Start Event	Play Error Message; Generate Start Event	ST: Goodbye
Shift	"1" Full Day; "2"Half day AM; "3"Half day PM;	N/A	ST: AbsenceType or if required ST: StartTime	Play Error Message; Generate Start Event	Play Error Message; Generate Start Event	ST: Goodbye
StartTime	Prompt for a military time	N/A	ST: AbsenceType	Play Error Message; Generate Start Event	Play Error Message; Generate Start Event	ST: Goodbye
AbsenceType	List Valid Absence Types from database	N/A	ST: ConfirmAbsence or if required ST:RecordInstructions	Play Error Message; Generate Start Event	Play Error Message; Generate Start Event	ST: Goodbye
RecordInstructions	Play instructions for recording a message	N/A	ST: ConfirmAbsence	Play Error Message; Generate Start Event	Play Error Message; Generate Start Event	ST: Goodbye
ConfirmAbsence	Replay contents of absence, prompt user to confirm;	N/A	"1"Pressed, ST: CheckComplete; "2"Pressed, ST: WhenAnotherDay	Play Error Message; Generate Start Event	Play Error Message; Generate Start Event	ST: Goodbye
CheckComplete	Press "1"Complete call and get confirmation number; "2"Enter an additional absence day;	N/A	"1"Pressed, ST: Goodbye; "2"Pressed, ST:WhenAnotherDay	Play Error Message; Generate Start Event	Play Error Message; Generate Start Event	ST: Goodbye
Entitlements	List Entitlement Day Balances, ST: MainMenu	N/A	N/A	N/A	N/A	N/A

292

293

294

ErrorState	Play standard error message; ST: Goodbye	N/A	N/A	N/A	N/A	N/A
Hangup	Hangup Phone; ST: End	N/A	N/A	N/A	N/A	N/A
Goodbye	Play goodbye message; ST: Hangup	N/A	N/A	N/A	N/A	N/A

655401-9923460

Figure 13B

States	Events					
	Start	Receive a call	Receive Valid Input	Receive Invalid Input	Timeout	Max Retries Reached
School Administrator Call-in						
MainMenu	Press "1" School Menu; Press "2" Entitlement Types Menu	N/A	"1" Pressed ST: RecordSchoolMenu; "2" Pressed ST: RecordEntTypesMenu	Play Error Message; Generate Start Event	Play Error Message; Generate Start Event	ST: Goodbye
RecordSchoolMenu	Prompt for valid School Recording ID	N/A	ST: RecordSchool, or if "#" pressed ST: MainMenu	Play Error Message; Generate Start Event	Play Error Message; Generate Start Event	ST: Goodbye
RecordSchool	Play existing recording, if exists then prompt "1" to Record new prompt, "#" to return to School Menu	N/A	"1" Pressed, record/verify prompt, ST: RecordSchoolMenu; "#" ST: RecordSchoolMenu	Play Error Message; Generate Start Event	Play Error Message; Generate Start Event	ST: Goodbye
RecordEntTypesMenu	Prompt for valid Entitlement Type Recording ID	N/A	ST: RecordEntTypes, or if "#" pressed ST: MainMenu	Play Error Message; Generate Start Event	Play Error Message; Generate Start Event	ST: Goodbye
RecordEntTypes	Play existing recording, if exists then prompt "1" to Record new prompt, "#" to return to Entitlement Types Menu	N/A	"1" Pressed, record/verify prompt, ST: RecordEntTypesMenu; "#" ST: RecordEntTypesMenu	Play Error Message; Generate Start Event	Play Error Message; Generate Start Event	ST: Goodbye
ErrorState	Play standard error message; ST: Goodbye	N/A	N/A	N/A	N/A	N/A
Goodbye	Thank caller for using system; ST: Hangup;	N/A	N/A	N/A	N/A	N/A
Hangup	Hangup Phone ST: End	N/A	N/A	N/A	N/A	N/A

Figure 13C

States		Events				
ST = State Transition	Start	Receive a call	Receive Valid Input	Receive Invalid Input	Timeout	Max Retries Reached
FrontLine Administration Call-in						
RecordFilesMenu	Prompt for the recording ID of the message file	N/A	ST: RecordFiles	Play Error Message; Generate Start Event	Play Error Message; Generate Start Event	ST: Goodbye
RecordFiles	Play existing recording, if exists then prompt "1" to Record new prompt, "#" to return to Record Files Menu	N/A	"1" Pressed, record/verify prompt, ST: RecordFiles;"#" ST: RecordFiles	Play Error Message; Generate Start Event	Play Error Message; Generate Start Event	ST: Goodbye
ErrorState	Play standard error meesge; ST: Goodbye	N/A	N/A	N/A	N/A	N/A
Goodbye	Thank caller for using system; ST: Hangup;	N/A	N/A	N/A	N/A	N/A
Hangup	Hangup Phone ST: End	N/A	N/A	N/A	N/A	N/A

303

304

305

306

307

665401 996344

Figure 13D

States		Events				
ST = State Transition	Start	Receive a call	Receive Valid Input	Receive Invalid Input	Timeout	Max Retries Reached
Substitute Call-out						
308 MakeTheCall	Dial the telephone number; ST: CallAnalysis	N/A	N/A	N/A	N/A	N/A
309 CallAnalysis	Determine how the call was or was not answered	N/A	Person Answers; ST: Identify	Person does not answer;	N/A	N/A
310 Identify	Prompt for SS Number or PIN Number	N/A	ST: PresentRequest	Generate Start Event	N/A	ST: Goodbye
311 PresentRequest	Play request, prompt substitute to "1"Replay; "2"Accept, "3"Reject	N/A	"1"Replay, Generate Start-Event; "2" ST: AcceptRequest; "3" ST: RejectRequest	Play Error Message; Generate Start Event	Play Error Message; Generate Start Event	ST: Goodbye
312 RejectRequest	"1" Reject w/No more calls; "2"Reject allowing for additional calls	N/A	ST: Goodbye	Play Error Message; Generate Start Event	Play Error Message; Generate Start Event	ST: Goodbye
313 AcceptRequest	Play confirmation number; ST: Goodbye	N/A	N/A	N/A	N/A	N/A
314 ErrorState	Play standard error message; ST: Goodbye	N/A	N/A	N/A	N/A	N/A
315 Hangup	Hangup Phone ST: End	N/A	N/A	N/A	N/A	N/A
316 Goodbye	Thank substitute for using system; ST: Hangup;	N/A	N/A	N/A	N/A	N/A

Parameter	Value
$\alpha$	0.05
$\beta$	0.05
$\gamma$	0.05
$\delta$	0.05
$\epsilon$	0.05
$\zeta$	0.05
$\eta$	0.05
$\theta$	0.05
$\iota$	0.05
$\kappa$	0.05
$\lambda$	0.05
$\mu$	0.05
$\nu$	0.05
$\xi$	0.05
$\omicron$	0.05
$\pi$	0.05
$\rho$	0.05
$\sigma$	0.05
$\tau$	0.05
$\upsilon$	0.05
$\phi$	0.05
$\chi$	0.05
$\psi$	0.05
$\omega$	0.05
$\Omega$	0.05
$\Theta$	0.05
$\Phi$	0.05
$\Psi$	0.05
$\Upsilon$	0.05
$\Sigma$	0.05
$\Pi$	0.05
$\Lambda$	0.05
$\Gamma$	0.05
$\Delta$	0.05
$\nabla$	0.05
$\propto$	0.05
$\partial$	0.05
$\int$	0.05
$\sum$	0.05
$\prod$	0.05
$\bigcap$	0.05
$\bigcup$	0.05
$\setminus$	0.05
$\oplus$	0.05
$\otimes$	0.05
$\oslash$	0.05
$\circ$	0.05
$\cdot$	0.05
$+$	0.05
$-$	0.05
$\times$	0.05
$\div$	0.05
$\frac{\partial}{\partial x}$	0.05
$\frac{\partial}{\partial y}$	0.05
$\frac{\partial}{\partial z}$	0.05
$\frac{\partial}{\partial t}$	0.05
$\frac{\partial}{\partial x^2}$	0.05
$\frac{\partial}{\partial y^2}$	0.05
$\frac{\partial}{\partial z^2}$	0.05
$\frac{\partial}{\partial t^2}$	0.05
$\frac{\partial}{\partial x^3}$	0.05
$\frac{\partial}{\partial y^3}$	0.05
$\frac{\partial}{\partial z^3}$	0.05
$\frac{\partial}{\partial t^3}$	0.05
$\frac{\partial}{\partial x^4}$	0.05
$\frac{\partial}{\partial y^4}$	0.05
$\frac{\partial}{\partial z^4}$	0.05
$\frac{\partial}{\partial t^4}$	0.05
$\frac{\partial}{\partial x^5}$	0.05
$\frac{\partial}{\partial y^5}$	0.05
$\frac{\partial}{\partial z^5}$	0.05
$\frac{\partial}{\partial t^5}$	0.05
$\frac{\partial}{\partial x^6}$	0.05
$\frac{\partial}{\partial y^6}$	0.05
$\frac{\partial}{\partial z^6}$	0.05
$\frac{\partial}{\partial t^6}$	0.05
$\frac{\partial}{\partial x^7}$	0.05
$\frac{\partial}{\partial y^7}$	0.05
$\frac{\partial}{\partial z^7}$	0.05
$\frac{\partial}{\partial t^7}$	0.05
$\frac{\partial}{\partial x^8}$	0.05
$\frac{\partial}{\partial y^8}$	0.05
$\frac{\partial}{\partial z^8}$	0.05
$\frac{\partial}{\partial t^8}$	0.05
$\frac{\partial}{\partial x^9}$	0.05
$\frac{\partial}{\partial y^9}$	0.05
$\frac{\partial}{\partial z^9}$	0.05
$\frac{\partial}{\partial t^9}$	0.05
$\frac{\partial}{\partial x^{10}}$	0.05
$\frac{\partial}{\partial y^{10}}$	0.05
$\frac{\partial}{\partial z^{10}}$	0.05
$\frac{\partial}{\partial t^{10}}$	0.05
$\frac{\partial}{\partial x^{11}}$	0.05
$\frac{\partial}{\partial y^{11}}$	0.05
$\frac{\partial}{\partial z^{11}}$	0.05
$\frac{\partial}{\partial t^{11}}$	0.05
$\frac{\partial}{\partial x^{12}}$	0.05
$\frac{\partial}{\partial y^{12}}$	0.05
$\frac{\partial}{\partial z^{12}}$	0.05
$\frac{\partial}{\partial t^{12}}$	0.05
$\frac{\partial}{\partial x^{13}}$	0.05
$\frac{\partial}{\partial y^{13}}$	0.05
$\frac{\partial}{\partial z^{13}}$	0.05
$\frac{\partial}{\partial t^{13}}$	0.05
$\frac{\partial}{\partial x^{14}}$	0.05
$\frac{\partial}{\partial y^{14}}$	0.05
$\frac{\partial}{\partial z^{14}}$	0.05
$\frac{\partial}{\partial t^{14}}$	0.05
$\frac{\partial}{\partial x^{15}}$	0.05
$\frac{\partial}{\partial y^{15}}$	0.05
$\frac{\partial}{\partial z^{15}}$	0.05
$\frac{\partial}{\partial t^{15}}$	0.05
$\frac{\partial}{\partial x^{16}}$	0.05
$\frac{\partial}{\partial y^{16}}$	0.05
$\frac{\partial}{\partial z^{16}}$	0.05
$\frac{\partial}{\partial t^{16}}$	0.05
$\frac{\partial}{\partial x^{17}}$	0.05
$\frac{\partial}{\partial y^{17}}$	0.05
$\frac{\partial}{\partial z^{17}}$	0.05
$\frac{\partial}{\partial t^{17}}$	0.05
$\frac{\partial}{\partial x^{18}}$	0.05
$\frac{\partial}{\partial y^{18}}$	0.05
$\frac{\partial}{\partial z^{18}}$	0.05
$\frac$	

States	Events					
ST = State Transition	Start	Receive a call	Receive Valid Input	Receive Invalid Input	Timeout	Max Retries Reached
Fax Call-out						
MakeTheCall	Call FaxNumber ST: CallAnalysis	N/A	N/A	N/A	N/A	N/A
CallAnalysis	Determine if Fax Answered	N/A	Fax Answered ST: FaxSend	Fax did not Answer ST: Hangup	N/A	N/A
FaxSend	Send Fax ST: End					
ErrorState	Play standard error meesge; ST: Goodbye	N/A	N/A	N/A	N/A	N/A
Goodbye	Thank substitute for using system; ST: Hangup;	N/A	N/A	N/A	N/A	N/A
Hangup	Hangup Phone ST: End	N/A	N/A	N/A	N/A	N/A

Figure 13F

Synchronization  
Client to Server

Client	Events									
States	Have Data	Don't Have Data	File Created	Connect FTP	Did Not Connect to FTP	File not there	Max Tries	Startup	Bad format	Save
323 Extract	Create file ST: Send	Create File ST: Send								
324 Send			Create FTP Session; Send File	Verify file was sent ST: Recieve; Else ST: Error			Error			
325 Receive						Check for file If pres ST: Import Else: Wait	Error			
326 Import						ST		Opens files; Verify file format	Refuse all changes	Save Changes
327 Cleanup								Moves files to archive; Sets last sync dates for all files		
Error										
Server	Events									
States	File Found	Startup								
328 Wait	Create File ST: Import Object									
329 Import Object		Opens; Verifys; Reads; Saves or discards;								
330 Extract		Create export file; ST:Send								
331 Send		Close file; copies to FTP site								

Figure 14A

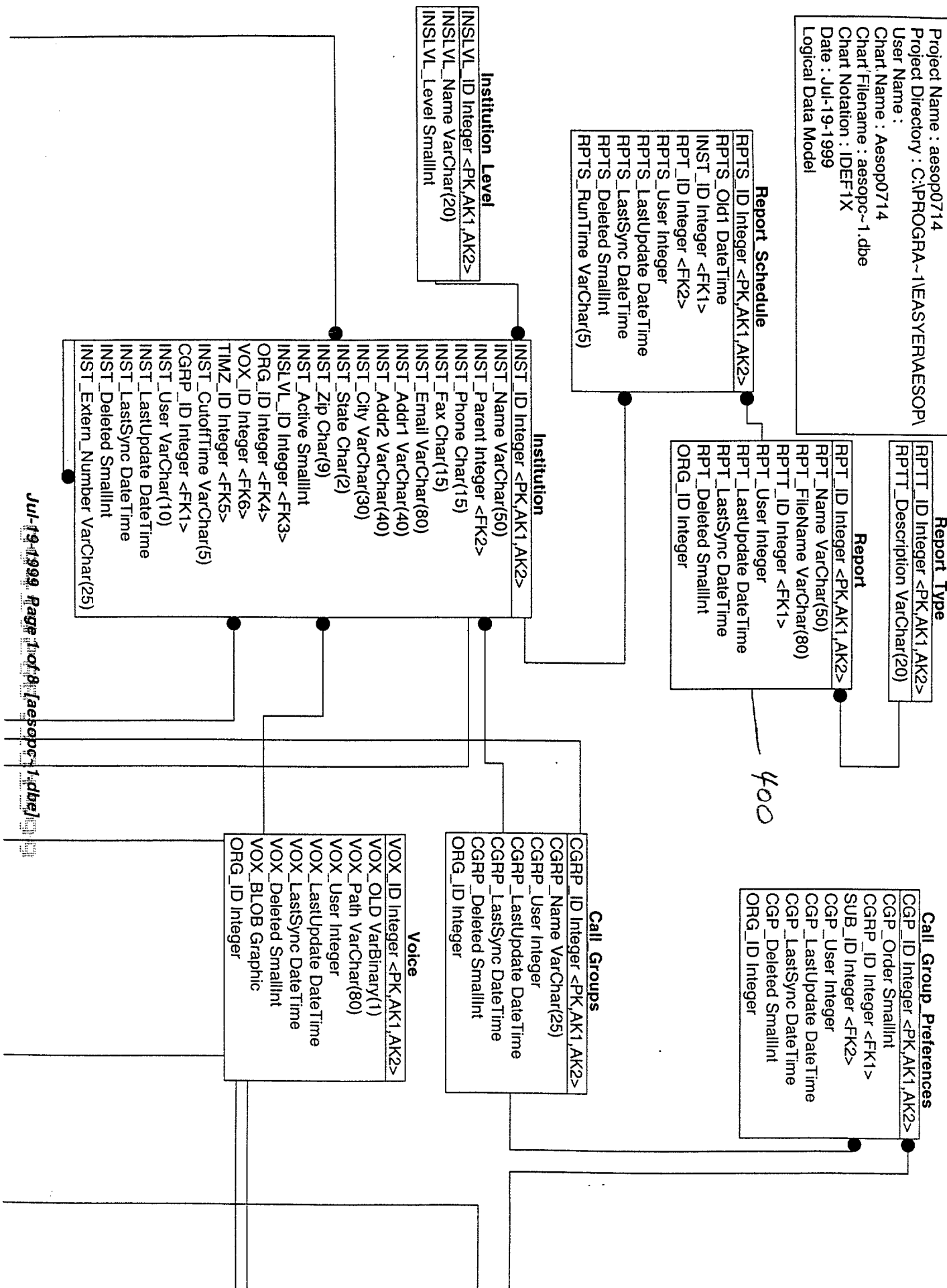




Figure 14B

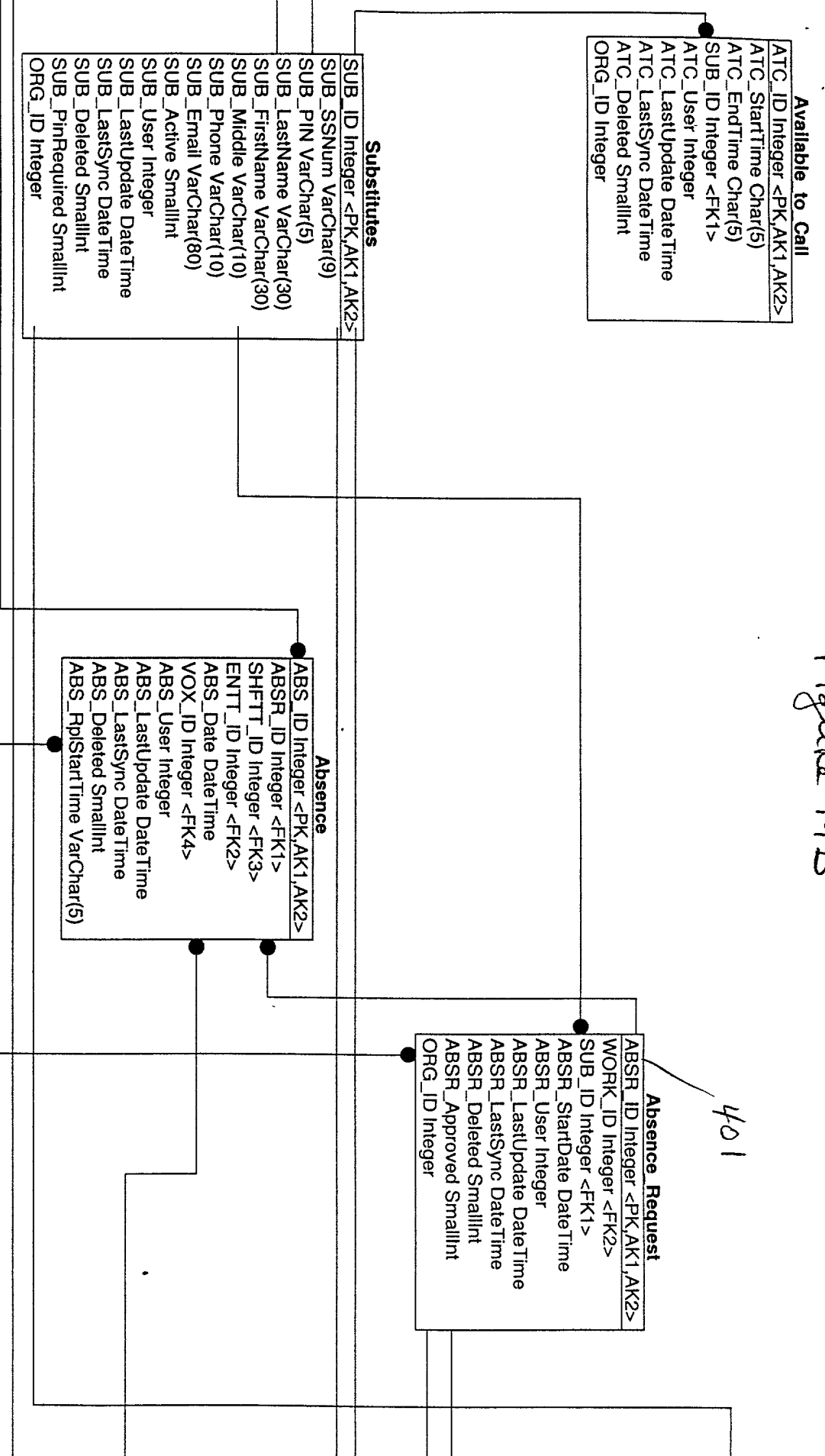
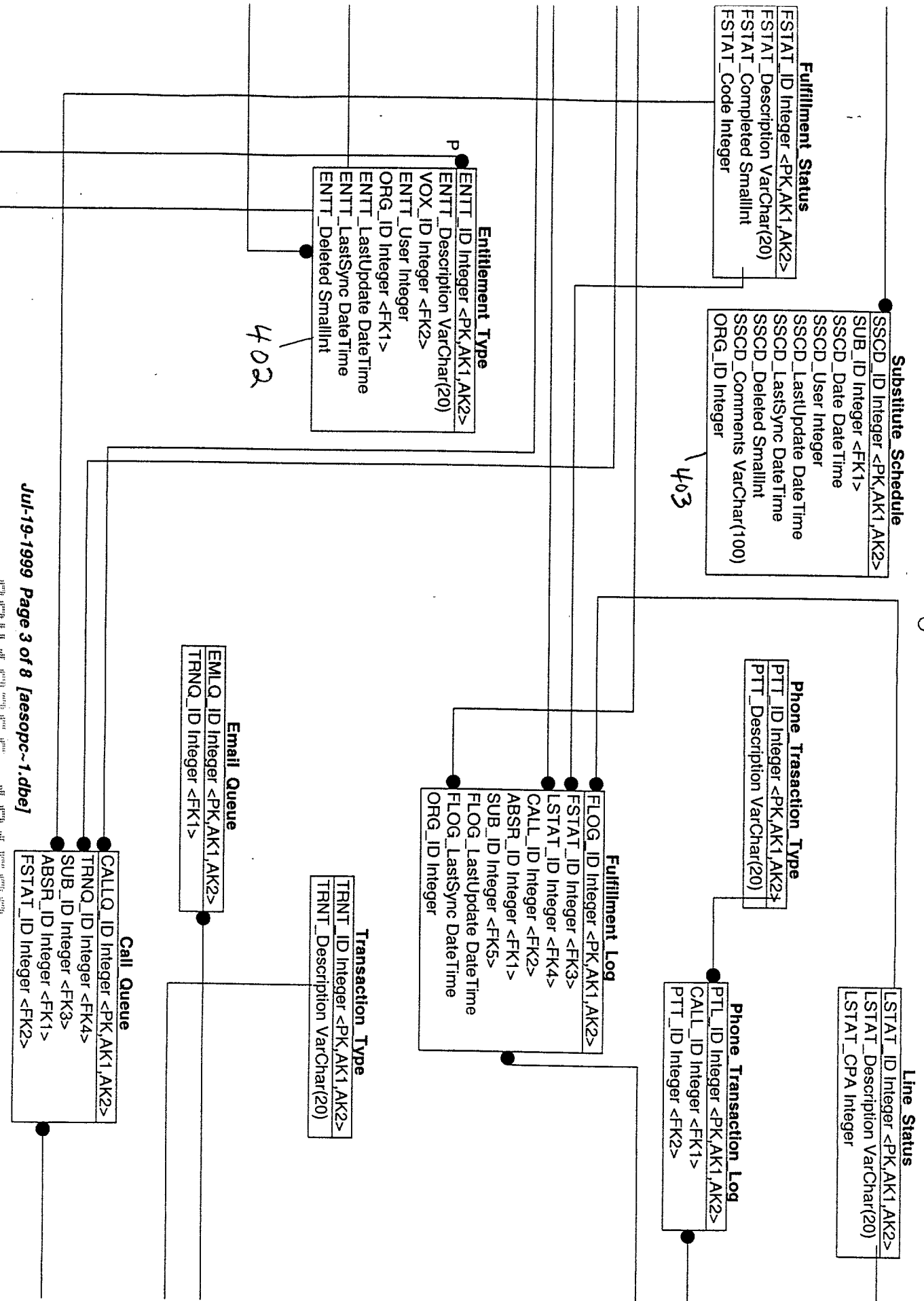


Figure 14-C



411

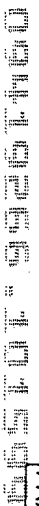
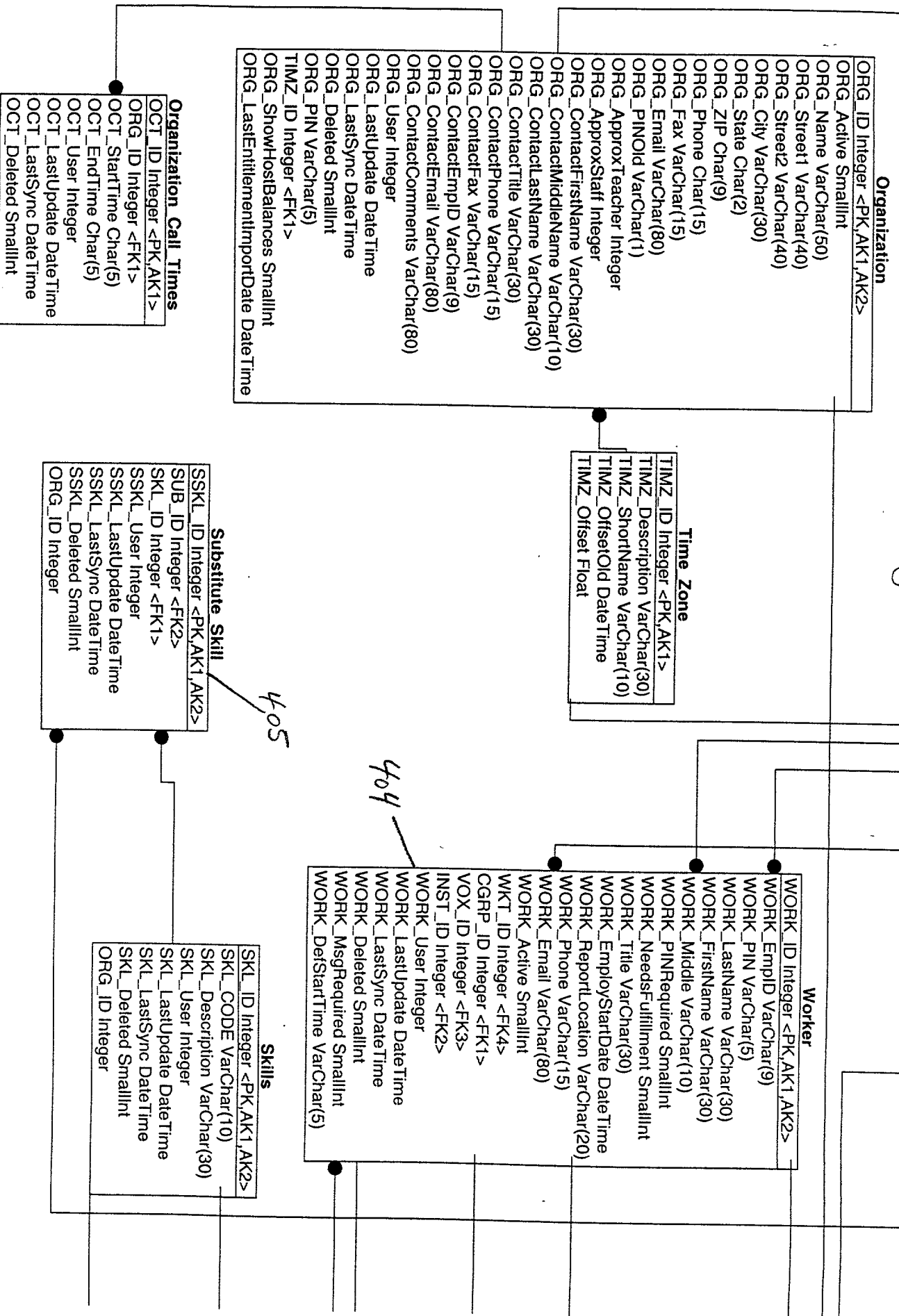


Figure 14-E



1000

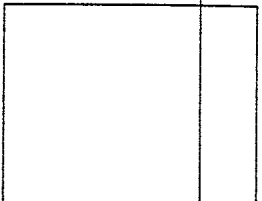


Figure 14-6

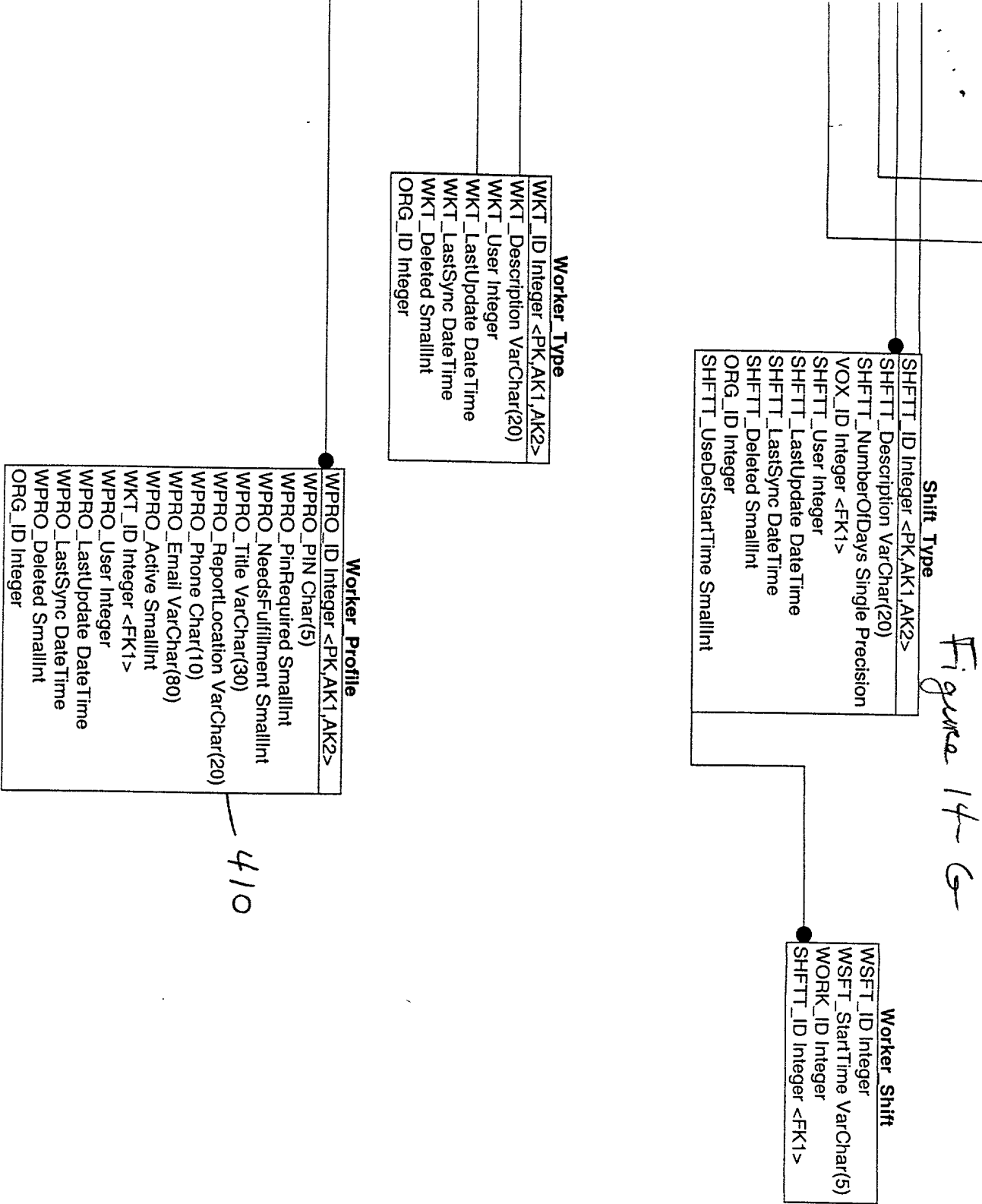


Figure 17-11

